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REMARKS

Applicant respectfully requests reconsideration of this application. Claims 1-5, 9-17, 19-25 and 29-31 are pending. All of the independent claims (Claims 1, 21 and 29) are currently amended to more particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Claims 26-28 were previously canceled, and claims 6-8 and 18 were previously withdrawn.

I. Summary of the Invention

The present invention relates to a portable foamer for spraying effluent in foam form. The claimed invention includes a mixing chamber where pressurized air and liquid combine after having been segregated from the point they exit the tank until the point they combine in the mixing chamber. The mixing chamber is configured to combine air and liquid together in such a way as to generate foam within the mixing chamber. The foam is expelled from the sprayer.

As defined in claim 1, the present invention is directed to a hand-operated portable foam sprayer having a tank, flow controller, and segregated air and liquid delivery systems. The flow controller defines a mixing chamber where pressurized air and liquid combine to form a foam effluent after being segregated from the point they exited the tank until the point at which they combine in the mixing chamber. The mixing chamber is configured to combine air and liquid together to generate foam within the mixing chamber. The flow controller defines an outlet for discharging the foam effluent.

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As defined in amended claim 21, the present invention is directed to a hand-operated, portable sprayer including a sealed, pressure-resistant tank. The tank is filled with liquid and includes a pump assembly to pressurize the headspace of the tank. The tank also has a liquid withdrawal tube inserted near the bottom of the tank that is in fluid communication with a liquid transport hose and an air transport hose in fluid communication with the headspace of the tank. The liquid transport hose and the air transport hose are also both in fluid communication with a flow controller defining a mixing chamber. The mixing chamber is configured to combine air and liquid together to generate foam within the mixing chamber. The flow controller defines an outlet for discharging the foam.

As defined in claim 29, the present invention is directed to a portable sprayer. The sprayer includes a tank and a mixing chamber separate from the tank. The tank and mixing chamber are connected by an air delivery system and a fluid delivery system such that the air and fluid are delivered separately from the tank to the mixing chamber. The mixing chamber is configured to combine the air and liquid to form foam within the mixing chamber. A flow controller controls the flow of foam from the sprayer.

As can be seen, the amended claims all recite a sprayer for discharging foam and a mixing chamber for combining air and liquid to generate foam within the mixing chamber. The mixing chamber is separate from the tank and is the point where the compressed air and liquid first converge after being separately transported from the tank. The foam is discharged by a flow controller.

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II. Art Rejections

Although the prior art discloses a wide variety of spraying devices, it is respectfully submitted that the subject matter of the amended claims is patentable over the art of record. As amended, the claims recite a mixing chamber configured to combine the air and the liquid to generate foam within the mixing chamber. The amended claims further recite that the flow controller defines an outlet for discharging the foam or that the flow controller controls the flow of foam from the sprayer. Additionally, as recited in some of the claims, the prior art fails to teach a mixing medium through which multiple materials (e.g. air and liquid) pass to encourage foam generation.

A. Rejections based on Altenburger and Hench

As previously presented, claims 1-2, 9, 11-17, 21-22 and 29 were rejected under 35 U.S.C 103(a) as being unpatentable over U.S. Patent 1,979,135 to Altenburger and U.S. Patent 5,390,854 to Hench. Applicant respectfully traverses this rejection as conceivably applied to the amended claims.

Altenburger is directed to a liquid sprayer and not to a foam sprayer. Altenburger includes segregated lines to carry liquid and compressed gas to the spray nozzle. The spray nozzle is configured so that the compressed air is used to provide greater carrying power to the liquid discharge (See Col. 1, Lines 9-15). Altenburger says nothing about the generation of foam—let alone the generation of foam within a mixing chamber that is discharged as a foam by a flow controller. Altenburger does not disclose, teach or suggest the use of compressed air to generate foam. In fact, the statement that compressed air is used to provide greater carrying

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power to the liquid discharge unambiguously demonstrates that foam is not generated by the sprayer because conversion to foam would decrease and not increase its carrying power.

Hench is, like Altenburger, directed to a liquid sprayer and not a foam sprayer. Hench includes segregated supply lines that carry liquid and compressed gas to a chamber separate from the tank. Although there is a separate chamber, the chamber does not combine the air and liquid to generate a foam within the chamber. To the contrary, inside the chamber the liquid is entrained within the gas permitting the sprayer to discharge a stream of liquid that has enhanced carrying power. As with Altenburger, Hench says nothing about the generation of foam, and does not teach or suggest that compressed air can be used to generate foam in a mixing chamber. Much to the contrary, Hench is designed to dispense the liquid in a "coherent, solid, semi-continuous stream within the gas." (See Col. 3, Lines. 59-61). The combination of air and liquid "leaves the [] chamber through an outlet means, such as a nozzle, as a stream of liquid entrained within a stream of gas." (See Col. 2, Lines 17-19). As further support of this position, the patent states that "the liquid will not tend to be atomized into a mist, but instead will remain a relatively coherent stream within the gas." (See Col. 2, Lines 27-29). Applicant wishes to remind the Examiner that he previously acknowledged that "Hench lacks dispensing a foam" on Page 2 of the Office Action mailed August 17, 2005.

Applicant respectfully submits that the proposed combination of Altenburger and Hayes does not render the subject matter of the amended claims obvious. In summary, (1) the proposed combination would not result in the subject matter of the amended claims, (2) there is no motivation or suggestion to combine the liquid effluent sprayers of Altenburger and Hench to

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obtain the subject matter of the amended claims, and (3) even if Hensch did dispense foam, combining Hensch with Altenburger would destroy the intended function of Altenburger.

First, the amended claims are directed to foam sprayers. For example, all of the amended claims recite a mixing chamber configured to combine air and liquid *to generate a foam within the mixing chamber*. Further, all of the amended claims recited a flow controller that defines an outlet for discharging the foam generated in the mixing chamber or that the flow controller controls the flow of foam from the sprayer.

As noted above, neither Altenburger nor Hensch disclose, teach or suggest a foam sprayer. Neither reference includes a mixing chamber configured to combine air and liquid *to generate a foam within the mixing chamber* or a flow controller that affects the discharge or flow of foam.

Because neither Altenburger nor Hensch disclose a mixing chamber configured to combine air and liquid *to generate a foam within the mixing chamber* or a flow controller that affects the discharge or flow of foam, no combination of these two references can result in the subject matter of the amended claims.

Second, even if the proposed combination of Altenburger and Hensch would result in the claimed subject matter, there is no motivation or incentive to modify the liquid effluent sprayer of Altenburger with the liquid sprayer of Hensch to obtain a foam-generating sprayer.

It is well settled that obviousness cannot be established by combining the teachings of the prior art, absent some teaching, suggestion, or incentive supporting the combination. In re Geiger, 2 U.S.P.Q.2d 1276 (Fed. Cir. 1987); ACS Hospital Systems, Inc. v.

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Montefiore Hospital, 221 U.S.P.Q. 929 (Fed. Cir. 1984). Even if the prior art can be modified to obtain the claimed invention, that fact alone does not render the claims obvious unless the prior art suggests the desirability of the modification. In re Laskowski, 10 U.S.P.Q.2d 1397 (Fed. Cir. 1989); In re Gordon, 221 U.S.P.Q. 1125 (Fed. Cir. 1984).

Altenburger discloses a sprayer designed to impart increased carrying power into a liquid effluent without the use of a mixing chamber. (Col. 1, Lines. 13-15). Altenburger is not a foam sprayer and does not relate in any way to the generation of foam. Hench is also not a foam sprayer. Hench is instead directed to delivering a stream of liquid entrained within a stream of gas so that the liquid will not become atomized and linger, suspended in the air, around the dispensing site. As with Altenburger, Hench does not disclose, teach or suggest the generation of a foam. Given that neither of these references relates in any way to the generation of foam, there is nothing to provide motivation or incentive for combining the teachings of these two references to arrive at the subject matter of the amended claims. For example, nothing in the prior art suggests combining the liquid sprayer of Altenburger (which imparts increased carrying capacity of liquid effluent) with the liquid sprayer of Hench (which provides an entrained stream of liquid) to obtain a foam sprayer having a mixing chamber that is configured to combine air and liquid to generate a foam within the mixing chamber.

Third, assuming for the sake of discussion that Hench did disclose a foam sprayer, modifying Altenburger to include the mixing chamber of Hench to dispense foam would destroy the intended function of Altenburger. Altenburger is attempting to provide a liquid stream that is expelled as far as possible and is not attempting to create a foam effluent. Altenburger's

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ambition is in direct opposition with the function of the subject invention which is to generate high quality foam. It seems quite clear that the generation of foam would materially reduce the carrying power of the effluent. As can be seen, modifying Altenburger to generate foam would destroy Altenburger's intended function of imparting maximum carrying power into a liquid effluent.

B. Rejections based on Altenburger, Hench and Hayes

As previously presented, claims 3-5 and 23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Altenburger in view Hench and further in view of U.S. Patent 3,801,015 to Hayes. Applicant respectfully traverses this rejection as conceivably applied to the amended claims.

Hayes does nothing to supplement the noted inadequacies of Altenburger and Hench discussed above, and is, in fact, an example of precisely that which the present invention was intended to overcome. Hayes generates foam at the tank and conveys the foam through a single extended supply line all the way to the nozzle. With this construction, the foam is likely to break down as it travels against back-pressure through the extended supply line to the flow controller.

Because Hayes does not overcome the shortcomings of Altenburger and Hench, it is respectfully submitted that dependent claims 3-5 and 23 are allowable at least for the same reasons as their respective independent claims. Further, these claims recite additional subject matter and are even more clearly allowable.

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C. Rejections based on Altenburger, Hench, Hayes and Petit

As previously presented, claims 19-20, 24-25 and 30-31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Altenburger in view of Hench and Hayes and further in view of U.S. Patent 5,328,099 to Petit. Applicant notes that claims 19-20, 24-25 and 30-31 differ from the remaining claims in that they recite a mixing medium. Applicant respectfully traverses this rejection as conceivably applied to the amended claims.

Petit is directed to a single-use sprayer utilized for disbursing a single dose of solid powder for inhalation in medical applications. Petit teaches a grid disposed between a piston delivery mechanism and a supply of solid powder. The grid defines a plurality of holes that are small enough to prevent the powder from passing through them. (Col. 5, Lines 10-12). Accordingly, the grid prevents the powder from infiltrating the piston delivery mechanism of the sprayer and prevents the friction-generating powder from corrupting the movement of the bead within the cylinder. At the same time, the grid permits a shot of compressed air to flow from the piston delivery mechanism to the supply of solid powder to expel the powder from the sprayer. Petit does not disclose a foam sprayer and does not disclose a mixing chamber configured to combine air and liquid to generate foam within the mixing chamber.

Applicant respectfully submits that the subject matter of the amended claims is not obvious in view of Altenburger, Hench, Hayes and Petit. In summary, 1) Petit does not overcome the inadequacies of Altenburger, Hench and Hayes noted above; 2) Petit does not disclose a mixing medium; 3) there is no motivation or suggestion for modifying Petit to obtain

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the subject matter of the amended claims; and 4) Petit is non-analogous art and, as such, cannot support an obviousness rejection.

First, Petit does nothing to address the shortcomings of Altenburger, Hensch and Hayes, but rather is cited for disclosing a mixing medium. Perhaps most notably, Petit does not disclose a foam sprayer and does not disclose a mixing chamber configured to combine air and liquid to generate foam within the mixing chamber. Because Petit does not resolve the inadequacies of the other applied references, the hypothetical combination of Altenburger, Hensch, Hayes and Petit would not result in the subject matter of the amended claims.

Second, Petit does not actually disclose a mixing medium. To the contrary, Petit discloses a separation medium. As noted above, the grid of Petit segregates the powder from the piston. The holes in the grid of Petit are large enough to permit air to flow through the grid, but small enough to prevent the powder from passing through the grid. Accordingly, only one of the two components (i.e. compressed air) even passes through the grid. Because only one component, air and not the powder, passes through the Petit grid, the grid cannot mix two components and therefore cannot function as a mixing medium. The fact is that the two components do not combined until after the air has passed through the grid. Because Petit does not disclose a mixing medium, even the proposed combination of Altenburger, Hensch, Hayes and Petit does not result in the subject matter of the amended claims.

Third, there is no motivation or incentive to modify the single-dose powder sprayer of Petit to obtain the foam generator of the present invention. As described above, Petit discloses a grid that serves to segregate powder from a piston delivery mechanism. The

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amended claims relate to the combination of air and liquid and have no need for a separator medium that prevents a solid powder from contaminating a piston delivery mechanism. Petit does not disclose, teach or even suggest the possibility that the separator grid could be used as a mixing medium—let alone a mixing medium in the context of foam sprayer that combines air and liquid to generate foam. In fact, Petit, Altenburger, Hayes and Hensch all fail to even recognize the problem of how to generate highly consistent foam, and, therefore, fail to motivate one to solve it. Accordingly, it is respectfully submitted that there is no motivation or incentive for providing the separator grid of Petit with Altenburger, Hensch and Hayes to obtain the subject matter of the amended claims.

Fourth, the single dose sprayer for disbursing powder of Petit is not analogous to the subject matter of the present invention. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also MPEP 2141.01(a). Petit and the present invention are not directed to the same field of endeavor. The claimed invention is directed to a foam sprayer that combines air and liquid to generate a foam effluent. As set forth in the Background, exemplary uses of the claimed invention include the application of pesticides, herbicides, germicides, degreasers, disinfectants, carpet treatments and cleaners. Petit is directed to a single-use device for delivering a metered dose of powder—for example, a medicinal powder. Petit states that such devices are generally used for nose sprays. Accordingly, the claimed invention is primarily

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intended for use in agricultural, chemical and janitorial applications, while Petit is primarily intended for use as a nose sprayer. Additionally, Petit is not in any way pertinent to the particular problem with which the claimed invention is concerned. The present invention is concerned with a foam sprayer that generates a high-quality, consistent foam through the combination of air and liquid. Petit does not relate to foam sprayers or to the generation of foam. It does not even relate to the combination of air and liquid. To the contrary, the Petit grid serves to segregate the powder that is to be expelled from infiltrating and compromising the function of the piston of the sprayer. Petit is pertinent to those limited concerns associated with the use of a piston delivery mechanism to expel a powder. Accordingly, it is respectfully submitted that Petit is non-analogous art because it is not in the field of the Applicant's endeavor and is not reasonably pertinent to the particular problem with which the invention was concerned.

C. Rejection based on Altenburger and Official Notice

As previously presented, claim 10 was rejected under 35 U.S.C 103(a) as being unpatentable over Altenburger in view of official notice that pressure release valves for pressurized containers are well known. Applicant respectfully traverses this rejection as conceivably applied to amended claim 10 (amended by virtue of the amendments made to independent claim 1).

As noted above, Altenburger suffers from a number of shortcomings. The official notice applied in this rejection does nothing to address the shortcomings of Altenburger discussed above in connection with amended claim 1. Accordingly, it is submitted that amended claim 10 is patentable for the reasons discussed above in connection with amended claim 1.

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D. Dependent Claims

The dependent claims present additional subject matter and are therefore even more clearly allowable than the independent claims discussed above. Claim 2 recites a hand pump for pressurizing the air in the headspace. Claim 3 recites that the control valve is located between the tank and the flow controller along the air delivery system. Claim 4 recites that the air control valve is a needle valve. Claim 5 recites that the air control valve is a pinch valve. Claim 9 recites that exterior surface of the tank contains an inlet orifice. Claim 11 recites that the air delivery system includes an exit orifice in the headspace portion of the tank. Claim 12 recites a withdrawal tube inserted into the tank through an exit orifice, in which one end of the withdrawal tube is connected to a liquid transport system and the other penetrates the interior of the tank to near the bottom of the tank. Claim 13 recites that the liquid delivery system includes an exit orifice located near the bottom of the tank, which is connected to a liquid transport system. Claim 14 recites that the liquid delivery system includes an exit orifice located on the tank and a flexible hose penetrating through the orifice into the tank. Claim 15 recites that the air transport system includes a flexible hose, whereby air is transported to the flow controller. Claim 16 recites that the liquid transport system includes a flexible hose, whereby liquid is transported to the flow controller. Claim 17 recites that the air and liquid delivery systems are arranged substantially side-by-side. Claim 23 recites that the flow controller includes a fitting at which the air transport hose and the liquid transport hose are connected to the flow controller, the fitting defines the mixing chamber, wherein liquid delivered by the liquid transport hose is merged with air delivered by the air transport hose.

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III. Conclusion

In view of the above Amendments and these Remarks, it is respectfully submitted that the application is in condition for allowance. A notice to that effect is earnestly and respectfully solicited. If the Examiner believes that it would be helpful to resolve any outstanding issues, he is invited to contact the undersigned.

Respectfully submitted,

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